IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Saecker	]	Art Unit: 1797
	]	
Serial No. 10/564,797	]	Examiner: I. Wu
	]	
Filed: May 12, 2006	]	Confirmation no: 3337
	]	
For: METHOD FOR REMOVING HYDROGEN SULFIDE AND…	]	Attorney Docket: 1-17210

February 23, 2011

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

BRIEF ON APPEAL

Honorable Sir:

This brief is in furtherance of the Notice of Appeal, which was timely filed in connection with the above-captioned application on December 23, 2010. This was filed in response to the action of June 28, 2010. The fees required under 37 CFR 1.17(F) are submitted herewith.

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1. Real Party in Interest

The real party in interest is Uhde GmbH, which is a subsidiary of ThyssenKrupp GmbH, a German company.

2. Related Appeals and Interferences

There is no known pending appeal or interference which will directly affect, or be directly affected by, or have a bearing on, the Board's decision in this Appeal.

3. Status of Claims

Applicants submitted an amendment in this matter on April 27, 2010. Subsequent to a final office action issued June 28, 2010, applicant submitted a Notice of Appeal in connection with the subject application, appealing the rejection of claims 4-5.

The status of each of the claims is as follows:

1. Claims cancelled: 1-3;
2. Claims withdrawn from consideration but not cancelled: None;
3. Claims pending: 4-5;
4. Claims allowed: None;
5. Claims rejected: 4-5.

The claims on appeal are 4-5. A copy of the claims on file is submitted in the attached Claims Appendix.

4. Status of Amendments

No amendment was filed subsequent to the rejection of the application by the Office Action of June 28, 2010.

5. Summary of Claimed Subject Matter

Each of the claims being separately argued herein is discussed hereinbelow.

The present invention, as defined by independent claim 4, defines a process for the removal of hydrogen sulphide and other sour gas components from industrial gases under pressure by means of physical scrubbing agents and for the recovery of sulphur from hydrogen sulphide using a Claus plant. The hydrogen sulphide and other sour gas components are absorptively dissolved a physically acting scrubbing agent. The physical scrubbing agent is regenerated in a multi-step regeneration, wherein the multi-step regeneration unit is equipped with at least one device each for CO enrichment, H_2S enrichment, CO_2 stripping and thermal regeneration. The various regeneration steps are operated at pressure levels that differ from each other and are lower than that of the absorption unit. A Claus gas rich in hydrogen sulphide is withdrawn from one of the regeneration steps and feeding it to a Claus plant which produces sulphur and the tail gas leaving the Claus plant is hydrated. The Claus gas rich in hydrogen sulphide is withdrawn from the device for thermal regeneration. The hydrated tail gas is compressed and fed to the device for CO enrichment and a gas stream that is rich in CO_2 , and enriched in CO relative to the hydrated tail gas is taken from a device for CO enrichment. A gas stream that is poor in CO and rich in CO_2 is taken from a device for H_2S enrichment.

Support for the invention as claimed in claim 4 can be found throughout the application as filed, but particularly:

Support for a process for the removal of hydrogen sulphide and other sour gas components from industrial gases under pressure by means of physical scrubbing agents and for the recovery of sulphur from hydrogen sulphide using a Claus plant can be found, at least, on page 2, lines 21-24.

Support for absorptively dissolving the hydrogen sulphide and the other sour gas components in a physically acting scrubbing agent can be found, at least, on page 2, lines 25-26.

Support for regenerating the physical scrubbing agent in a multi-step regeneration, wherein the multi-step regeneration unit is equipped with at least one device each for CO enrichment, H_2S enrichment, CO_2 stripping and thermal regeneration can be found, at least, on page 2, lines 27-29.

Support for operating the various regeneration steps at pressure levels that differ from each other and are lower than that of the absorption unit can be found, at least, on page 2, lines 30-31.

Support for withdrawing a Claus gas rich in hydrogen sulphide from one of the regeneration steps and feeding it to a Claus plant which produces sulphur can be found, at least, on page 2, lines 32-33.

Support for hydrating the tail gas leaving the Claus plant can be found, at least, on page 2, line 34.

Support for the Claus gas rich in hydrogen sulphide is withdrawn from the device for thermal regeneration can be found, at least, on page 2, lines 35-36.

Support for the hydrated tail gas is compressed and fed to the device for CO enrichment can be found, at least, on page 2, line 37.

Support for a gas stream that is rich in CO_2, and enriched in CO relative to the hydrated tail gas is taken from a device for CO enrichment can be found, at least, on page 3, lines 1-2.

Support for a gas stream that is poor in CO and rich in CO_2 is taken from a device for H_2S enrichment can be found, at least, on page 3, lines 3-4.

6. Grounds for Rejection to be Reviewed on Appeal

On June 28, 2010, the Examiner issued an Office Action in connection with the present application.

Claims 4-5 were rejected under 35 USC §103 as being unpatentable over Hegarty (US4254094) in view of Peterman (US 4155987) and Fenton (US 4206194).

7. Arguments

Claims 4 and 5 stand or fall together and will be argued collectively herein, in particular with regard to independent claim 4.

Rejection of Claims 4-5 under 35 USC §103 as being unpatentable over Hegarty (US4254094) in view of Peterman (US 4155987) and Fenton (US 4206194).

The Examiner indicates that in his opinion, the Hegarty reference discloses a process for producing hydrogen from synthesis gas containing COS. The Examiner acknowledges that Hegarty does not teach the step of hydration of the Claus tail gas as claimed. The Examiner looks to Fenton for this feature. The Examiner acknowledges that neither of these references disclose compression and feeding of the tail gas to the CO enrichment device, and relies on Peterman for this disclosure. The Examiner states that it would have been obvious to have used flashed gas from flash drum 17.

The Examiner's attention is brought to the Hegarty reference, and specifically column 24 which was referenced by the Examiner in his rejection. Column 24 of Hegarty is used to remove traces of H_2S under essentially the same pressure conditions as found in first absorption column 10. Columns 10 and 24 are arranged in series in the main gas line. It is not possible to enrich H_2S in the solution that is drained from column 24, as the achievable concentration is so low that the solution drained from column 24 could be used to absorb H_2S in the first column 10. Thus, column 24 of the Hegarty reference cannot be considered to act as an enrichment column.

The Examiner also opines that stripper 41 of Hegarty works at a lower pressure than preceding flash drum 17. However, while this figure does not show a pump it there certainly is no indication that one is not present. Often pumps and valves are eliminated from these types of drawings to focus on the main equipment with enough additional information to show flow directions. Additionally, the pressure is affected by the relative heights and positions of the equipment as well. This simple flowsheet thus cannot

confirm that such conveying equipment is not present, and it is not possible from this sheet to assume certain pressure levels for the liquids.

In view of the above, it is respectfully submitted that column 24 of Hegarty is not equivalent to the enrichment column of the present invention.

Fenton utilizes a chemical solvent working at atmospheric pressure, which is not equivalent to or interchangeable with a process using a physical solvent at an elevated pressure. Because of the very different process conditions, Fenton does not recycle hydrated tail gas but produces elementary sulfur. The Examiner opines that it would be obvious to install the aqueous solution wash step of Fenton for the tail gas leaving the Claus plant. While it is submitted that this is not obvious, in view of the different mechanics of the plants, it is further submitted that in any matter Fenton uses an aqueous solution which is not utilized in the present invention. Therefore, even if Fenton could be combained with the primary reference, it still does not show this feature as stated by the Examiner.

With regard to Peterman, this reference discloses a process where hydrated tail gas is conveyed to a H_2S absorber after passing through a cooling zone. After passing through the absorber the gas is released to the atmosphere. One skilled in the art would recognize that this is a SCOT scrubbing process like MDEA which operates at atmospheric pressure. The Examiner states that it would be obvious to have compression in the Claus unit for tail gas delivery, but it is respectfully submitted that one skilled in the art would have no reason to assume that a delivery to the atmosphere would need to be subject to compression. This would be extremely counterintuitive to

one skilled in the art. Therefore, it is respectfully submitted that this feature is also non-obvious in view of the art of record.

Further it is respectfully submitted that the Examiner opined that hydrogenated Claus tail gas is sent to the H_2S absorber. It will feed to the flash drum 17 (CO enrichment unit). It is submitted that this feature cannot be found in any of the applied references, and it is respectfully requested that if the Examiner wishes to rely on this element that he show this feature in the prior art.

The present invention yields the highly advantageous result of having the compression of the Claus tail gas being very slight, in the 1 to 3 bar range. This advantageous feature results in a significant cost savings over known processes. Also the CO content in the offgas if the H_2S enrichment is lower, which is also an advantageous result. These results cannot be obtained through any reasonable combination of the applied references.

In the Examiner's previous response, it was asserted that applicants did not provide quantity as a measure of "enrichment". It is submitted that one skilled in the art would recognize that the teaching of Hegarty did not qualify as "enrichment" as the term is used in the field.

The Examiner also disagreed with applicants statements regarding stripper 41 of Hegarty. However, it is respectfully pointed out that the Examiner's assertion that stripper 41 operates at a lower pressure than the preceding flash drum is also speculative. It is submitted that nothing in Hegarty defines this pressure, and that any conclusions as to the pressure of this unit must be speculative.

In view of the above it is respectfully submitted that no reasonable combination of the applied references yield the present invention as claimed in claim 4.

Claim 5 depends from claim 4 and is believed allowable based, at least, upon this dependence.

CONCLUSION

In view of the above arguments, it is therefore respectfully submitted that each of the independent claims are allowable over the applied art of record. As independent claim 4 is patentable for the reasons discussed, and as claim 5 depends from this independent claim, applicant submits claims 4 and 5 are patentable. An expeditious determination by the Board to that effect is respectfully requested.

Respectfully submitted,

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CLAIMS APPENDIX

Claim 4 A process for the removal of hydrogen sulphide and other sour gas components from industrial gases under pressure by means of physical scrubbing agents and for the recovery of sulphur from hydrogen sulphide using a Claus plant, comprising:

- absorptively dissolving the hydrogen sulphide and the other sour gas components in a physically acting scrubbing agent;
- regenerating the physical scrubbing agent in a multi-step regeneration, wherein the multi-step regeneration unit is equipped with at least one device each for CO enrichment, H_2S enrichment, CO_2 stripping and thermal regeneration;
- operating the various regeneration steps at pressure levels that differ from each other and are lower than that of the absorption unit;
- withdrawing a Claus gas rich in hydrogen sulphide from one of the regeneration steps and feeding it to a Claus plant which produces sulphur;

  hydrating the tail gas leaving the Claus plant, wherein
- the Claus gas rich in hydrogen sulphide is withdrawn from the device for thermal regeneration;
- the hydrated tail gas is compressed and fed to the device for CO enrichment;
- a gas stream that is rich in CO_2 , and enriched in CO relative to the hydrated tail gas is taken from a device for CO enrichment; and
- a gas stream that is poor in CO and rich in CO_2 is taken from a device for H_2S enrichment.

Claim 5 (previously presented): The process according to claim 4, wherein a process implemented as physical absorption is based on the Rectisol, Selexol or Morphysorb process.

EVIDENCE APPENDIX

none

RELATED PROCEEDINGS APPENDIX

none